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Abstract

Rationale and Objective—To determine the relationship between screening mammography facility characteristics and on-site availability of advanced breast imaging services required for supplemental screening and the diagnostic evaluation of abnormal screening findings.

Materials and Methods—We analyzed data from all active imaging facilities across six regional registries of the National Cancer Institute-funded Breast Cancer Surveillance Consortium offering screening mammography in calendar years 2011–2012 (n=105). We used generalized estimating equations regression models to identify associations between facility characteristics

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(e.g., academic affiliation, practice type) and availability of on-site advanced breast imaging (e.g., ultrasound, magnetic resonance imaging (MRI)) and image-guided biopsy services.

Results—Breast MRI was not available at any non-radiology or breast imaging only facilities. A combination of breast US, breast MRI, and imaging-guided breast biopsy services was available at 76.0% of multi-specialty breast centers compared to 22.2% of full diagnostic radiology practices (p=0.0047) and 75.0% of facilities with academic affiliations compared to 29.0% of those without academic affiliations (p=0.04). Both supplemental screening breast ultrasound and screening breast MRI were available at 28.0% of multi-specialty breast centers compared to 4.7% of full diagnostic radiology practices (p<0.01) and 25.0% of academic facilities compared to 8.5% of non-academic facilities (p=0.02).

Conclusion—Screening facility characteristics are strongly associated with the availability of on-site advanced breast imaging and image-guided biopsy service. Therefore, the type of imaging facility a woman attends for screening may have important implications on her timely access to supplemental screening and diagnostic breast imaging services.

Keywords

Screening; breast cancer; mammography; diagnostic imaging

INTRODUCTION

Inherent health system attributes, such as place of service, strongly influence both access to and quality of healthcare in the U.S.[1–4] For women undergoing routine breast cancer screening in the U.S., both access to and quality of breast imaging services varies widely.[5–9] For women with an abnormal screening result, timely and complete diagnostic imaging evaluation is a critical, intermediate step between screen-detected malignancy and definitive treatment.[10,11] Appropriate diagnostic breast imaging frequently requires modalities beyond mammography, including diagnostic breast ultrasound (US), image-guided breast biopsy, and breast magnetic resonance imaging (MRI)(e.g., for extent of disease and surgical planning).[12] Patient access to and ready availability of these advanced breast imaging modalities, therefore, may play an important role in preventing delays in diagnostic evaluation and, potentially, worse patient outcomes.[13,14]

Over the last decade, technological advances in breast imaging modalities, including higher resolution breast US and breast MRI, along with expansion of their clinical indications, have caused the rapid diffusion of these technologies into community practices.[15] However, the diffusion and adoption of these advanced imaging modalities may not occur based on patient need, including high lifetime breast cancer risk.[16] Moreover, the demand for more advanced breast imaging is likely to increase with new breast density reporting laws enacted by states across the U.S.[17] These laws mandate that imaging facilities inform women with mammographically dense breasts that they are at increased risk of developing cancer and some also require notification that they may benefit from supplemental screening.[18] For women at increased risk of developing cancer, both screening breast US and screening MRI have been found to increase cancer detection beyond mammography alone, and annual screening breast MRI is a cost-effective measure among women at very high breast cancer risk.[19,20] Utilization of breast MRI is also increasing among women with a personal history of breast cancer for routine surveillance.[16]

Thus, for both women who seek an imaging facility that can provide diagnostic breast imaging or biopsy on-site if a screening abnormality is detected and for women who seek supplemental screening beyond mammography, it would be helpful to know what types of imaging facilities are more likely to offer advanced breast imaging services. Our study objective was to describe the current advanced breast imaging availability at U.S. community-based imaging facilities based on their characteristics, including for-profit status, academic affiliation, and practice type. Specifically, we aimed to determine the relationship between facility-level characteristics and the availability of breast US, breast MRI, and image-guided breast biopsies, alone and in combination, among a national sample of U.S. community imaging facilities that offer screening mammography.

MATERIALS AND METHODS

Study Population

We obtained data from a large cohort of active imaging facilities that are included in the National Cancer Institute-funded Breast Cancer Surveillance Consortium (BCSC), a collaborative network of mammography registries that represent the largest national database regarding breast cancer screening (http://breastscreening.cancer.gov). The population served by the BCSC has been shown to be comparable to the U.S. population.[5,21] We analyzed pooled data sent to the BCSC Statistical Coordinating Center (SCC) during calendar years 2011 and 2012, from six registries (New Hampshire, North Carolina, San Francisco, Vermont, Chicago, and Western Washington). Each registry and the SCC received institutional review board approval for either active or passive consenting processes or a waiver of consent to enroll individual facilities, link data, and perform analytic studies. All procedures were Health Insurance Portability and Accountability Act (HIPAA) compliant, and each registry and the SCC received federal certificates of confidentiality and other protections for the identities of individual community facilities.

Data Collection

Each of the six registries obtained data from their respective BCSC-affiliated imaging facilities that offer screening mammography. Individual fixed-location facilities self-reported their data on the availability of advanced breast imaging modalities beyond mammography, as well as image-guided breast biopsy services for calendar years 2011–2012. Imaging data included the availability of breast US (for screening and any indication), breast MRI (for screening and any indication), stereotactic core breast biopsy, US-guided core breast biopsy, and MRI-guided core breast biopsy.

Individual facilities reported their academic medical center affiliation (if any), their for-profit versus not-for-profit status, and their practice type. For practice type, we categorized each stand-alone facility as a non-radiology practice, breast imaging only practice, full diagnostic radiology practice, or a multi-specialty breast center. Each facility was asked to select a single practice type that best described them. We defined a non-radiology practice as an imaging facility located within and operated by a different specialty (e.g., obstetrics and gynecology clinic). We defined a breast imaging only practice as a facility that only offers imaging services specific to the breasts and no other anatomic body part. We defined a full diagnostic radiology practice as one that offers imaging services for multiple anatomic body parts beyond the breasts. Finally, we considered a multi-specialty breast center to be a facility that is part of an integrated care center with on-site breast-specific specialists in addition to radiologists (e.g., a cancer center with on-site breast oncologists, breast radiation oncologists, and breast pathologists).

Statistical Analysis

We performed statistical analyses using SAS version 9.3 (SAS Institute, Cary, NC) and Stata version 12 (Statacorp LP, College Station, TX). We tabulated the distribution of facility characteristics (for-profit status, academic affiliation, and practice type). We then used generalized estimating equations (GEE) to calculate the proportion of facilities of each profit status, academic affiliation, and practice type that provided advanced breast imaging services. Specifically, we examined the availability of breast US (for screening or any indication), breast MRI (for screening or any indication), image-guided breast biopsy (stereotactic, US-guided, MRI-guided, and any imaging-guided), and combinations of advanced breast imaging and image-guided breast biopsy services by facility characteristics. Each model regressed a binary indicator of service provision on dummy variables for the facility characteristic of interest. Our GEE models accommodated correlation among individual fixed-location facilities belonging to the same imaging group practice (e.g., multiple fixed-location facilities affiliated with one another and/or under the same management) through the use of the robust Huber-White (sandwich) variance estimator.[22] We obtained predicted probabilities from each model and estimated 95% confidence bounds around each probability estimate via the delta method. Confidence bounds were not calculated for probability estimates of exactly zero or one. We report p-values based on the joint Wald test of model parameters associated with the facility characteristic of interest, with $p<0.05$ considered statistically significant. Since the goal of our analysis is to identify associations and generate hypotheses for future study, no adjustment for multiple comparisons was performed.[23]

RESULTS

We obtained data from all 105 active fixed-location breast imaging facilities across the six regional BCSC registries (Table 1). Of these, 81% of imaging facilities (85/105) provided information on for-profit status. Of the 85 facilities reporting profit status, 27.1% (23/85) had for-profit status and 72.9% (62/85) had not-for-profit status. Of the 105 facilities, 7.6% (8/105) were affiliated with an academic institution. The majority of facilities were full diagnostic radiology practices (66/105, 62.9%), followed by multi-specialty breast centers (25/105, 23.8%), non-radiology practices (10/105, 9.5%), and breast imaging only practices (4/105, 3.8%).

For-profit status and academic affiliation were not associated with availability of breast US or breast MRI at an individual facility (Table 2). However, availability of advanced breast imaging services differed by type of practice. Specifically, all observed multi-specialty breast centers offered breast US, and full diagnostic practices were more likely to offer breast US than breast imaging only or non-radiology practices (81.8% vs. 50% and 22.2%, respectively, p<0.0001). Multi-specialty breast centers were significantly more likely to provide breast MRI services compared to full diagnostic radiology practices (76% versus 39.1%, respectively, p = 0.024). None of the non-radiology and breast imaging only practices offered breast MRI services.

For supplemental screening indications, there was no statistically significant difference between for-profit status or academic status and the availability of advanced breast cancer screening modalities. Screening ultrasound and screening breast MRI were not available at any breast imaging only or non-radiology practice. While there was no statistically significant difference in availability of screening ultrasound at multi-specialty breast centers versus full diagnostic radiology practices, screening breast MRI was available at 56.0% of multi-specialty breast centers versus 18.8% of full diagnostic radiology practices (p = 0.020).

For-profit imaging facilities were more likely to offer image-guided breast biopsies (p=0.028), including US-guided breast biopsies (p=0.03). However, there was no statistically significant relationship between for-profit status and the availability of the most lucrative biopsy procedure, MRI-guided breast biopsy (p=0.23). Instead, MRI-guided breast biopsy was available at 75.0% of facilities with an academic affiliation versus 24.0% of facilities without an academic affiliation (p=0.019). The availability of imaging-guided biopsy services was also related to practice type (p=0.011, for any imaging-guided biopsy) (Table 3). Specifically, multi-specialty breast centers were more likely to offer stereotactic, US-guided, and MRI-guided breast biopsy services compared to full diagnostic radiology practices (p = 0.0012, 0.0089, and 0.0063, respectively).

When assessing the availability of different combinations of advanced breast imaging modalities and/or image-guided breast biopsy services, there were no statistically significant associations between their availability and for-profit status of imaging facilities (Table 4). However, a combination of both screening breast US and screening breast MRI was more likely to be available at multi-specialty breast centers compared to full diagnostic radiology practices (28.0% versus 4.7%, p=0.0009) and facilities with an academic affiliation compared to those without an affiliation (25.0% versus 8.5%, p=0.022). In addition, a combination of breast US, breast MRI, and imaging-guided breast biopsy services was available at 76.0% of multi-specialty breast centers compared to 22.2% of full diagnostic radiology practices (p=0.0047) and 75.0% of facilities with academic affiliations compared to 29.0% of those without academic affiliations (p=0.041).

DISCUSSION

Our study, involving a large national sample of breast imaging facilities, demonstrated a significant association between screening facility characteristics and availability of advanced breast imaging modalities beyond mammography. Interestingly, the profit status of screening facilities was less strongly related to the availability of different advanced breast imaging services than practice type and academic affiliation. To our knowledge, our study is the first to demonstrate a relationship between screening facility characteristics and the availability of on-site advanced breast imaging modalities.

Our findings may be important for referral of patients as attending multiple facilities for imaging purposes may result in delays in diagnosis, greater lost time and out-of-pocket expenses from added travel, potential repeat imaging with a change in institution, or potential medical errors with the transfer of clinical and imaging data between facilities.[24] We found that the type of practice women attend for mammography screening may influence their ability to readily access additional breast imaging required to complete diagnostic work-ups after abnormal screening. Specifically, women attending multi-specialty breast centers and full diagnostic radiology practices for screening are more likely to have advanced breast imaging services readily available compared to women attending non-radiology or breast imaging only practices. Therefore, women attending such facilities are less likely to have to travel to another facility to obtain complete diagnostic evaluations prior to resolution of screening abnormalities or definitive treatment for screen-detected cancer.

The strong relationship between practice type and advanced breast imaging availability extends beyond availability of modalities for usual diagnostic evaluations. For women seeking supplemental screening, such as women with mammographically dense breasts or those at very high lifetime risk of developing cancer, screening breast US and screening breast MRI were more likely to be available at multi-specialty breast centers, followed by full diagnostic radiology practices. Screening breast US and screening breast MRI were also more likely to be available at facilities affiliated with academic medical centers.

Interestingly, many facilities offering diagnostic ultrasound and diagnostic breast MRI services did not offer screening ultrasound or screening breast MRI services. This was true across all categories of facilities, regardless of for-profit status, academic affiliation, or practice type. This finding suggests that other factors, such as financial reimbursement or adherence to screening guidelines and recommendations, may be affecting the on-site availability of supplemental breast cancer screening services. These other potential enabling characteristics should be included in future research studies examining advanced breast imaging availability.

Based on our analysis, patients seeking to obtain all of their breast imaging for the full potential breast care continuum at one location are most likely to find a combination of multiple advanced modalities and imaging-guided biopsy services at multi-specialty breast centers, followed by full diagnostic radiology practices. This association is important for providers and patients to be aware of, as women with screen-detected abnormalities that need diagnostic imaging and potentially biopsy may obtain more expedient care if they select to attend multi-specialty breast centers or full diagnostic radiology practices for screening, rather than non-radiology or breast imaging only practices. For women at high-risk or with a personal history of breast cancer who obtain frequent screening breast MRI exams, MRI-guided biopsy is most likely available at facilities associated with an academic medical center.

A major strength of our study is that it involves a large cohort of currently active breast imaging facilities with a patient population similar to that of the U.S.[5,21] Furthermore, our analysis accounts for potential non-independence of facilities belonging to the same group practice. However, there were limitations to our study. First, some of the facilities offering screening mammography may have affiliations with diagnostic imaging centers apart from their own group practice or health system, still akin to a spoke-and-hub practice model for screening. Such affiliations are not accounted for in our analysis, but may still allow for timely access to advanced imaging modalities for both supplemental screening and diagnostic work-up after screening mammography. Second, we considered only the ready availability of breast US, breast MRI, and image-guided biopsy. We did not consider the ready availability of newer modalities, such as digital breast tomosynthesis and automated whole breast US, for which data were not available at the time of our analysis. Third, we did not evaluate advanced breast imaging availability based on the specific needs of the patient populations served. Finally, 19% of facilities did not report their for-profit status in order to protect their anonymity, which somewhat limits interpretation of the reported associations between for-profit status and availability of advanced imaging.

In conclusion, our analysis demonstrates that screening facility characteristics are strongly related to the availability of on-site advanced breast imaging capabilities. Women seeking supplemental screening or complete diagnostic evaluations at the same physical site as their screening mammogram may choose to be more discerning about what type of screening facility they choose to attend. Advanced breast imaging modalities and image-guided biopsy services are most likely to be found at facilities that are part of a multi-specialty breast center, followed by full diagnostic radiology practices, and then breast imaging only and non-radiology practices. Moreover, future studies evaluating the effects of access to breast cancer screening on patient outcomes should consider imaging facility-level characteristics such as practice type, as they may have important implications on timely diagnostic evaluation and prevention of potential delays to definitive treatment after abnormal screening.

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Table 1

Characteristics of Breast Imaging Facilities Participating in the Breast Cancer Surveillance Consortium

Facility Characteristics	n=105
Profit / Not for profit status, n (%)	
For profit	23 (27.1%)
Not for profit	62 (72.9%)
Unknown*	20
Academic medical center status, n (%)	
Yes	8 (7.6%)
No	97 (92.4%)
Facility type, n (%)	
Multi-specialty breast center	25 (23.8%)
Full diagnostic radiology practice	66 (62.9%)
Breast imaging only	4 (3.8%)
Non-radiology practice	10 (9.5%)

*One Breast Cancer Surveillance Consortium registry does not report profit status in order to protect the anonymity of its facilities

Table 2

Availability of Advanced Breast Imaging by Breast Cancer Surveillance Consortium Facility Characteristic

		Any Ultrasound	Screening Ultrasound	Any MRI	Screening MRI
Number of facilities providing non- missing data on use of this technology		**104**	**104**	**103**	**103**
Facility Characteristics	**N**				
Profit / Not for profit status					
For profit	23	20 (87.0%; 55.5, 97.3)	4 (17.4%; 8.5, 32.3)	11 (47.8%; 29.2, 67.0)	5 (21.7%; 7.5, 48.9)
Not for profit	61	47 (77.0%; 59.1, 88.6)	14 (23.0%; 15.8, 32.0)	24 (40.0%; 24.0, 58.4)	15 (25.0%; 8.9, 53.2)
Unknown	20	16 (80.0%; 49.9, 94.1)	6 (30.0%; 15.0, 51.0)	9 (45.0%; 25.0, 66.7)	6 (30.0%; 13.8, 53.4)
*P value**		*0.25*	*0.47*	*0.63*	*0.87*
Academic medical center status					
Yes	8	6 (75.0%; 31.7, 95.1)	3 (37.5%;14.1, 68.6)	6 (75.0%; 31.6, 95.1)	4 (50.0%; 19.8, 80.2)
No	96	77 (80.2%; 62.5, 90.8)	21 (21.9%; 16.0, 29.1)	38 (40%; 29.2, 51.9)	22 (23.2%; 13.6, 36.7)
P value		*0.79*	*0.27*	*0.13*	*0.064*
Facility type					
Multi-specialty breast center	25	25/25 (100%)	9 (36.0%; 19.9, 56.0)	19 (76.0%; 45.9, 92.2)	14 (56%; 24.8, 83.1)
Full diagnostic radiology practice	66	54 (81.8%; 65.6, 91.4)	15 (22.7%; 15.7, 31.6)	25 (39.1%; 26.3, 53.5)	12 (18.8%; 9.9, 32.6)
Breast imaging only	4	2 (50.0%; 12.1, 87.9)	0/4 (0%)	0/4 (0%)	0/4 (0%)
Non-radiology practice	9	2 (22.2%; 10.6, 40.7)	0/9 (0%)	0/10 (0%)	0/10 (0%)
P value†		*<0.0001*	*0.19*	*0.024*	*0.020*

Results shown here are the number of facilities which reported providing the imaging service in question (columns) within each category of the facility characteristic (row). Percentages are based on observed frequencies divided by the denominators shown in the column marked "N", except for the following columns:

- Denominator is 60 for "not for profit" facilities offering any ultrasound and screening ultrasound
- Denominator is 95 for non-academic medical centers offering any ultrasound and screening ultrasound
- Denominator is 66 for full diagnostic radiology practices offering any ultrasound and screening ultrasound

The 95% confidence intervals are derived via delta method from post-estimation predicted probability estimates obtained from unadjusted GEE models of the outcome regressed on the corresponding facility characteristic. Models accommodate the non-independence of facilities belonging to the same practice.

All p values are from joint Wald tests of parameters estimated by GEE modeling for each descriptive variable.

* P-values shown for profit status were obtained from models restricted to facilities with non-missing profit status information.

†P-values shown for facility type were obtained from models restricted to multi-specialty breast centers and full diagnostic radiology practices, except in the case of the provision of any ultrasound, for which modeling was restricted to full diagnostic, breast imaging only, and non-radiology practices.

Table 3

Availability of Imaging-Guided Biopsy Services by Breast Cancer Surveillance Consortium Facility Characteristic

		Any Guided Biopsy Services	Stereotactic Guided Biopsy	Ultrasound Guided Biopsy	MR Guided Biopsy
Number of facilities providing non- missing data on use of this technology		**104**	**104**	**104**	**104**
Facility Characteristics	**N**				
Profit / Not for profit status					
For profit	22	7 (31.8%; 13.6, 58.1)	5 (22.7%; 7.7, 50.9)	7 (31.8%; 13.6, 58.1)	3 (13.6%; 3.3, 42.1)
Not for profit	62	40 (64.5%; 47.7, 78.4)	32 (51.6%; 35.1, 67.8)	39 (62.9%; 48.6, 75.3)	20 (32.3%; 21.7, 44.9)
Unknown	20	15 (75.0%; 48.3, 90.6)	9 (45.0%; 25.0, 66.7)	15 (75.0%; 48.3, 90.6)	6 (30.0%; 11.2, 59.3)
P value[*]		*0.028*	*0.076*	*0.030*	*0.23*
Academic medical center status					
Yes	8	6 (75.0%; 31.7, 95.1)	6 (75.0%; 31.7, 95.1)	6 (75.0%; 31.7, 95.1)	6 (75.0%; 31.7, 95.1)
No	96	56 (58.3%; 44.2, 71.2)	40 (41.7%; 29.3, 55.2)	55 (57.3%; 44.4, 69.3)	23 (24.0%; 17.1, 32.5)
P value		*0.45*	*0.14*	*0.42*	*0.019*
Facility type					
Multi-specialty breast center	25	24 (96.0%; 75.7, 99.5)	23 (92.0%; 70.9, 98.2)	24 (96.0%; 75.7, 99.5)	17 (68.0%; 36.9, 88.5)
Full diagnostic radiology practice	65	38 (58.5%; 39.5, 75.2)	23 (35.4%; 17.4, 58.8)	37 (56.9%; 40.1, 72.3)	12 (18.5%; 10.8, 29.7)
Breast imaging only	4	0/4 (0%)	0/4 (0%)	0/4 (0%)	0/4 (0%)
Non-radiology practice	10	0/10 (0%)	0/10 (0%)	0/10 (0%)	0/10 (0%)
P value[†]		*0.011*	*0.0012*	*0.0089*	*0.0063*

Results reflect the number of facilities which reported providing the imaging service in question (columns) within each category of the facility characteristic (row). Percentages are based on observed frequencies divided by the denominators shown in the column marked "N". The 95% confidence intervals are derived via delta method from post-estimation predicted probability estimates obtained from unadjusted GEE models of the outcome regressed on the corresponding facility characteristic. Models accommodate the non-independence of facilities belonging to the same practice.

All p values are from joint Wald tests of parameters estimated by GEE modeling for each descriptive variable.

[*] P-values shown for profit status were obtained from models restricted to facilities with non-missing profit status information.

[†] P-values shown for facility type were obtained from models restricted to multi-specialty breast centers and full diagnostic radiology practices, except in the case of the provision of any ultrasound, for which modeling was restricted to full diagnostic, breast imaging only, and non-radiology practices.

Table 4

Availability of a Combination of Imaging and Imaging-Guided Biopsy Services by Breast Cancer Surveillance Consortium Facility Characteristic

		Both any ultrasound and any MRI	**Both screening ultrasound and screening MRI**	**Any ultrasound and any MRI and guided biopsy services**
Number of facilities providing non-missing data on use of this technology		**102**	**102**	**101**
Facility Characteristics	**N**			
Profit / Not for profit status				
For profit	23	11 (47.8%; 29.2, 67.1)[a]	2 (8.7%; 1.8, 32.7)	4 (18.2%; 5.5, 46.1)
Not for profit	59	22 (37.3%; 25.0, 51.5)	6 (10.2%; 3.0, 29.6)	20 (33.9%; 23.3, 46.4)
Unknown	20	9 (45.0%; 25.0, 66.7)	2 (10.0%; 2.2, 35.1)	9 (45.0%; 25.0, 66.7)
P value[*]		*0.46*	*0.89*	*0.32*
Academic medical center status				
Yes	8	6 (75.0%; 31.6, 95.1)	2 (25.0%; 8.2, 55.6)	6 (75.0%; 31.6, 95.1)
No	94	36 (38.3%; 29.1, 48.4)[b]	8 (8.5%; 3.9, 17.6)	27 (29.0%; 22.4, 36.7)
P value		*0.11*	*0.022*	*0.041*
Facility type				
Multi-specialty breast center	25	19 (76.0%; 45.9, 92.2)	7 (28.0%; 12.7, 50.9)	19 (76.0%; 45.9, 92.2)
Full diagnostic radiology practice	64	23 (35.9%; 24.9, 48.7)[c]	3 (4.7%; 1.6, 12.9)	14 (22.2%; 13.7, 33.9)
Breast imaging only	4	0/4 (0%)	0/4 (0%)	0/4 (0%)
Non-radiology practice	9	0/9 (0%)	0/9 (0%)	0/9 (0%)
P value[†]		*0.023*	*0.0009*	*0.0047*

Results shown here are the number of facilities that reported providing the imaging service in question (columns) within each category of the facility characteristic (row). Percentages are based on observed frequencies divided by the denominators shown in the column marked "N", except for the following columns:

- Denominator is 22 for "for profit" facilities offering both any ultrasound and any MRI
- Denominator is 93 for non-academic medical centers offering both any ultrasound and any MRI
- Denominator is 63 for full diagnostic radiology practices offering both any ultrasound and any MRI

The 95% confidence intervals are derived via delta method from post-estimation predicted probability estimates obtained from unadjusted GEE models of the outcome regressed on the corresponding facility characteristic. Models accommodate the non-independence of facilities belonging to the same practice.

All p values are from joint Wald tests of parameters estimated by GEE modeling for each descriptive variable.

[*] P-values shown for profit status were obtained from models restricted to facilities with non-missing profit status information.

[†] P-values shown for facility type were obtained from models restricted to multi-specialty breast centers and full diagnostic radiology practices, except in the case of the provision of any ultrasound, for which modeling was restricted to full diagnostic, breast imaging only, and non-radiology practices.